

6. On the South-African Rhinoceroses. By F. C. SELOUS.
(Communicated by Dr. A. GÜNTHER, F.R.S. &c.)

[Received May 21, 1881.]

(Plate LXII.)

In those portions of Southern and South Central Africa in which I have hunted I have only met with two true species of Rhinoceroses—namely the large, square-mouthed, grass-eating species (*Rhinoceros simus*), and the smaller prehensile-lipped Rhinoceros, which feeds exclusively upon bush (*R. bicornis*). In making this statement I am well aware that I express an opinion at variance with that held by many naturalists upon the subject; however, as the conclusions at which I have arrived are the results of eight years devoted entirely to hunting in the most out-of-the-way portions of the interior of South Africa, during the first three of which (that is, in 1872, 1873, and 1874) Rhinoceroses were still very plentiful, and as even since that time I have had many opportunities of personally observing the habits and peculiarities of each and every variety of these animals, and as, moreover, I shall support my views by specimens of horns, I think that I am warranted in expressing an opinion upon the subject. At any rate it is now quite time that the question of how many species of Rhinoceroses do really exist in South Africa should be finally set at rest; and it is only by comparing the statements of men who are really competent to give an opinion upon the subject that this is ever likely to be done.

For my part I am fully persuaded that there are only two species in South Africa, or, indeed, in all Africa; for the North-African Rhinoceros in the gardens of this Society I have no hesitation in pronouncing to be specifically identical with the South-African Prehensile-lipped Rhinoceros.

I will first speak of the Square-mouthed Rhinoceros (*R. simus*). Twenty years ago this animal seems to have been very plentiful in the western half of Southern Africa; now, unless it is still to be found between the Okavango and Cunene rivers, it must be almost extinct in that portion of the country. And this is not to be wondered at when one reads the accounts in Andersson's and Chapman's books of their shooting as many as eight of these animals in one night as they were drinking at a small water-hole; for it must be remembered that these isolated water-holes, at the end of the dry season, represented all the water to be found over an enormous extent of country, and that therefore all the Rhinoceroses that in happier times were distributed over many hundreds of square miles were in times of drought dependent upon perhaps a single pool for their supply of water. In 1877, during several months' hunting in the country to the south of Linyanti, on the river Chobe, I only saw the spoor of two Square-mouthed Rhinoceroses, though in 1874 I had found them fairly plentiful in the same district; whilst in 1879, during

eight months spent in hunting on and between the Botletlie, Mababe, Machabe, Sunta, and Upper Chobe rivers, I never even saw the spoor of one of these animals, and all the bushmen that I met with said they were finished. In 1878 and 1880, however, I still found them fairly numerous in a small tract of country in North-eastern Mashuna Land, between the Umniati and Ganyane rivers. Their range, however, is rather limited towards the north, as they only inhabit the country lying to the south of the belt of rough stony hills which in this district extend for more than a hundred miles southwards from the banks of the Zambesi river. Their extermination in this portion of the country may therefore, I am afraid, be expected within a very few years; and the Square-mouthed Rhinoceros will then only exist in a few small tracts of S.E. Africa in the neighbourhood of the river Sabi.

The Square-mouthed Rhinoceros feeds exclusively upon grass, and is therefore more partial to open countries, or districts where there are broad grassy valleys between the tracts of bush, than the Prehensile-lipped Rhinoceros, which is fond of thickets or rough hills clothed with short scrub. Both species are a sort of dark slate-colour; and so far from one being white and the other black, I should be sorry to state upon oath which was the darker of the two.

The Square-mouthed Rhinoceros is a huge ungainly-looking beast, with a disproportionately large head, a large male standing 6 feet 6 inches at the shoulder. Like elephants and buffaloes they lie asleep during the heat of the day, and feed during the night and in the cool hours of early morning and evening. Their sight is very bad; but they are quick of hearing, and their scent is very keen; they are, too, often accompanied by rhinoceros-birds, which, by running about their heads, flapping their wings, and screeching at the same time, frequently give them notice of the approach of danger. When disturbed they go off at a swift trot, which soon leaves all pursuit from a man on foot far behind; but if chased by a horseman they break into a gallop, which they can keep up for some distance. However, although they run very swiftly, when their size and heavy build is considered, they are no match for an average good horse. They are, as a rule, very easy to shoot on horseback, as, if one gallops a little in front of and on one side of them, they will hold their course and come sailing past, offering a magnificent broadside shot; whilst under similar circumstances a Prehensile-lipped Rhinoceros will usually swerve away in such a manner as only to present his hind quarters for a shot. As with elephants, it is very unsatisfactory work following up wounded rhinoceroses, as they do not stop and lie down, but walk on and on until their strength gives way. They die very quickly when shot through both lungs or the upper part of the heart; but if the shot strikes them in front, and the bullet only perforates one lung, they will travel astonishing distances, though throwing blood out of their mouth and nostrils by the gallon. With a broken shoulder they will run, first at a gallop and then at a halting trot, for more than a mile; but if they have a hind leg broken, they do not appear to be able to budge a step. When either walking or running, the

Square-mouthed Rhinoceros holds its head very low, its nose nearly touching the ground. A small calf always runs in front of its mother; and she appears to guide it by holding the point of her horn upon the little animal's rump; and it is perfectly wonderful to note how in all sudden changes of pace, from a trot to a gallop or *vice versa*, the same position is always exactly maintained. During the autumn and winter months (*i. e.* from March till August) the Square-mouthed Rhinoceros is usually very fat; and its meat is then most excellent, being something like beef, but yet having a peculiar flavour of its own. The part in greatest favour amongst hunters is the hump, which, if cut off whole and roasted just as it is in the skin in a hole dug in the ground, would, I think, be difficult to match either for juiciness or flavour.

In the Square-mouthed Rhinoceros the horns vary much in different individuals—so much so, indeed, that it would not be difficult to find two specimens (taking both horns, of course) exhibiting forms of horns as widely divergent one from another as are the typical horns of *R. bicornis* from those of the so-called *R. keitloa*.

The anterior horn of a full-grown Square-mouthed Rhinoceros measures from 18 inches to over 4 feet in length, a cow having a thinner and usually a longer horn than a bull. Now-a-days, however, owing probably to all those that possessed remarkably long horns having been shot, it is very rarely one sees a horn from a freshly-killed animal measuring over 3 feet in length. This anterior horn usually has a curve backwards, more or less pronounced; but specimens are by no means uncommon which are perfectly straight, or even bend slightly forwards. When the horn is quite straight and about 3 feet in length, the point touches the ground as the animal walks along feeding; and thus, in specimens of long straight horns, it may usually be noticed that just at the point the anterior surface of the horn has been rubbed flat by friction against the ground. I never remember to have seen an anterior horn of a Square-mouthed Rhinoceros that was perfectly round: they always have the front surface partially flattened, and may thus at a glance be distinguished from the invariably rounded anterior horn of the Prehensile-lipped Rhinoceros. In different individuals, too, the posterior horn of the Square-mouthed Rhinoceros varies from a lump only 3 or 4 inches in height to a horn 2 feet in length. In some specimens the anterior horn is long, whilst the posterior is very short; in others, again, both are well developed; and in some, again, both are short. In fact, the horns of all South-African Rhinoceroses differ to such an extent in different individuals that if their classification is to be based upon the length and shape of their horns alone, it would be as easy to make twenty species as four. If *R. oswelli* (a variety of *R. simus* based entirely upon the shape of the anterior horn) were a true species, I presume that the Square-mouthed Rhinoceros with a straight anterior horn would not interbreed with those carrying the commoner form of horn slightly curved backwards: yet in the Mashuna country I have seen Square-mouthed Rhinoceroses consorting together, the anterior horns of

which showed the greatest divergence of shape; and as a series of horns could be obtained showing every gradation of form between the extreme form of *R. oswelli* (which is bent forwards) to one so bent back as to describe half the arc of a circle, I do not think there are any adequate grounds for considering *R. oswelli* to be a true species. As regards the assertion that the horn of the ordinary Square-mouthed Rhinoceros never attains the length of those of *R. oswelli*, the longest horn I have ever seen was brought out by a trader named Reader, and is (or was a few years ago) in the possession of a gentleman residing in Hope Town, in the Cape colony. This horn measured 4 feet 6 inches, and had a very strong curve backwards. Upon these grounds I consider *R. oswelli* to be a false species, and think that in future works upon natural history it ought to be omitted from the list of South-African Rhinoceroses.

I now come to the Prehensile-lipped Rhinoceros (*R. bicornis*), of which I maintain that there is but one true species, in spite of whatever may be said by old Dutch hunters and natives to the contrary. This animal is still fairly numerous in many districts of South-eastern Africa, although, like its congener, the Square-mouthed Rhinoceros, it has been almost exterminated in the more westerly portions of the country. In 1879 there were still two or three drinking in the Upper Chobe, to the north-west of the Sunta outlet. Between the Chobe and the Zambesi there are none; and according to the natives there never were any there, even when the Makololo first came into the country; but directly the Zambesi has been crossed they are again found, and extend apparently through all Central Africa right up to Abyssinia. The Prehensile-lipped Rhinoceros lives exclusively upon bush and roots, eating not only the young leaves as they sprout from the end of a twig, but also chewing up a good deal of the twig itself. It is owing to the fact that this species lives upon bush that its range is very much more extended than that of the Square-mouthed Rhinoceros; for there are many large districts of country in the neighbourhood of the Zambesi to the eastward of the Victoria Falls covered almost entirely with an endless succession of rugged hills, almost devoid of grass, though well wooded, in all of which districts the Prehensile-lipped Rhinoceros is numerous, as it thrives well upon the scrubby bush with which the hill-sides and valleys are covered; whereas the square-mouthed species, though common in the forest-clad sandbelts and broad grassy valleys which always skirt the hills, is seldom or never found amongst the hills themselves, which is doubtless because the pasturage is too scanty to enable them to exist.

The Prehensile-lipped Rhinoceros is usually represented as an animal of so morose and vicious a disposition that it will almost invariably attack unprovoked any man or animal that it happens to meet; and I think that the general impression of people who are in the habit of reading books upon South-African sport, and have had no personal experience of the animals described, must be that this is the most dangerous animal to be met with in the country.

It may be that they differ in disposition in different parts of the country; but wherever I have met with them I have never found them to be by any means dangerous animals. Indeed I only remember to have seen one make any attempt at a charge; and that was in the Mashuna country last year, and under strong provocation; for I galloped close in front of an old cow, endeavouring to turn her from her course, upon which she came straight at me, snorting loudly, but upon my spurring to one side did not follow me, but resumed her way. Accidents have certainly happened in encounters with the Prehensile-lipped Rhinoceros; but many cases are also upon record of hunters having been killed or badly injured by the square-mouthed species, which is always represented as the most harmless and inoffensive of beasts. Mr. Oswell had his horse killed by one of the latter animals (*vide* Livingstone's 'Missionary Travels'); the veteran elephant-hunter Mr. Hartley was also very severely injured by one of these animals in the Mashuna country—I think, in 1869. David Jacobs, too, a son of the well-known Dutch hunter Petrus Jacobs, and who had been constantly hunting with his father for many years, told me that the only narrow escape he ever had from a Rhinoceros was from a square-mouthed one, which chased him for over a hundred yards through some nasty bush; and I myself, in November 1874, saw a white Rhinoceros bull, which I had wounded, make a very decided charge at a boy of mine, who threw down his gun and took refuge in a tree. I only mention these facts to show that, although the Square-mouthed Rhinoceros is usually a most inoffensive animal, occasional specimens may be found that are capable of resenting ill-treatment; and, so far as my small experience goes, I have found vicious animals to be equally few and far between amongst the prehensile-lipped species.

These Rhinoceroses are very quick and restless in their movements, and either very inquisitive or mistrustful of their eyesight; for usually, when disturbed by any one approaching from below the wind, they will jump up with a snort, gaze fixedly at the intruder, then, with another snort, trot quickly a few steps nearer, stand again, move their heads with a quick motion, first to one side, then to the other, advance again perhaps, and finally, when shouted at, whisk quickly round and trot away in grand style, with their tails screwed up over their backs. Whilst hunting in the Mashuna country in 1872, and to the west of the river Gwai in 1873, I encountered almost daily one or more Prehensile-lipped Rhinoceroses, often seeing five, six, or even eight in one day. When these animals got my wind, they invariably made off at once; but when they only saw me, they usually acted as I have described above. Upon these latter occasions my Kafirs were in the habit of shouting to me to run away, climb a tree, &c., and often did so themselves; however, I always stood where I was, throwing sometimes sticks, stones, or assegais at them, sometimes only shouting; and although some of them advanced from a distance of say forty yards to within about twenty, they always turned and ran off in the end. Upon several occasions I have fired into a Rhinoceros thus facing me, which, dropping upon its knees to the shot, has

sprung up again immediately, and come rushing straight forwards, snorting like a steam-engine, and passing perhaps within a few yards of me. In these cases, however, it always appeared to me that the animal had no idea of charging, but was just rushing madly forwards, half stunned by the shock of the heavy bullet. I have seen the same thing happen to some people, both black and white, who described it afterwards as the most terrific charge; and many a Black-Rhinoceros story has originated, I feel sure, in this way. That a Prehensile-lipped Rhinoceros when in full career, and either wounded or tired, will charge any one or any thing, even to a waggon or span of oxen, that he sees directly in his path and close in front of him, I know well enough; but so will an elephant, buffalo, or lion. What I wish to argue is, not that the Black Rhinoceros is a sweet-tempered animal, but that, at any rate in the great majority of cases, he is by no means the surly, morose, and dangerous beast that some travellers would have one believe. Somehow or other he has got an evil reputation, which, however unjust, will outlive the last of his species in South Africa. Kafirs who have never seen a Rhinoceros will tell you that it is a witch, and that it will follow up a man's spoor, attack him in the night, &c., simply because that is the character tradition has given him. Similarly many Hottentot and white hunters, who have only been hunting since Rhinoceroses became very scarce, and who perhaps have not seen half a dozen of these animals in their lives, will relate endless stories of their unprovoked ferocity; for it is one of their articles of faith that a Prehensile-lipped Rhinoceros is a most ferocious animal, and they therefore invent stories to suit his supposed character. Now there are very few Kafir or Hottentot hunters who will meddle with a lion, unless they meet him under exceptionally favourable circumstances; but, except when on elephant-spoor, or afraid of disturbing those animals, they will seldom pass a Rhinoceros, no matter of what species, without attacking him; for they know that they have to deal with an animal easy to approach and easy to kill, and one that will give them a great quantity of good meat; yet to hear them talk about the animals you would imagine the Rhinoceros to be the more dangerous of the two. What first gave rise to the very general impression that the Prehensile-lipped Rhinoceros is such a very dangerous animal I cannot imagine, unless, perhaps, in former years, before the introduction of firearms, there did exist some old and morose individuals of this species that committed a great many atrocities, and which have since been shot, leaving only their evil name to their descendants. However, be that as it may, speaking of the Prehensile-lipped Rhinoceros of the present day, after an experience of eight years, during which time I have encountered over one hundred of these animals, I can conscientiously say that I consider their pursuit to be attended with less danger than that of the lion, elephant, or buffalo.

In the end of November 1874, I chased a Prehensile-lipped Rhinoceros bull round and round on an open flat (at Thammasetjie, on the Zambesi road), until he stood still with his mouth

open ; and I then dismounted within twenty yards of him ; yet he never attempted to charge. Now I doubt if there is a lion, an elephant, or a buffalo which, under similar circumstances, would not have charged. In my experience of hunting, many fatal accidents, and still more narrow escapes, from lions, elephants, and buffaloes have come within my personal knowledge, but not one hunter, black or white, has been injured by a Black Rhinoceros.

I will now give my reasons for asserting that *R. bicornis* and *R. keitloa* are not two distinct species, but merely varieties of the same animal. Perhaps the most convincing argument in favour of their being two distinct species is that all the old Dutch hunters and most of the natives declare that such is the case, and have different names for the two animals. This, however, is by no means so strong an argument as it would at first appear. At first sight the typical *R. keitloa*, with both horns of equal length, is a very different-looking animal from the typical *R. bicornis*, with a posterior horn of only a few inches length ; and it is only after a careful study of their habits, and the knowledge that every variety of horn between the two extremes may be found, that I have become convinced that *R. keitloa* and *R. bicornis* are only varieties of the same animal. Now the greater part of the old Dutch hunters, although they may have shot very many Rhinoceroses in the course of their hunting careers, know nothing whatever about the animals from a scientific point of view. They shot Rhinoceroses because they wanted meat ; but the only examination they ever made of them was to see if they were fat. When now and again they shot a Rhinoceros with both horns of equal length, or nearly equal length, it struck their eye as being unusual, and so they gave these equal-horned animals the name of Blue Rhinoceroses, to distinguish them from the White and the Black, as they call *R. simus* and *R. bicornis* respectively. Now I have questioned many of these old hunters upon the subject, and find that the only point upon which they all agree is that the Blue Rhinoceros has both horns of equal length, whilst the Black has always a short second horn ; beyond this none of them know of any definite distinction ; but many, not liking to appear ignorant, make assertions that will not bear investigation, and one will often contradict the statements of other equally experienced men. Now in the same way every Dutch hunter will tell you that there are three, or even four, distinct species of lions in Southern Africa, each species possessing its own distinctive characteristics. These species they determine according to the length and colour of the mane in different individuals. Yet I think that naturalists are now agreed that there is but one species of lion in all Africa. Therefore as regards lions the testimony of old Dutch hunters is worthless from a scientific point of view ; and I believe it to be equally worthless with regard to the plurality or unity of species of the Prehensile-lipped Rhinoceros. One famous old Dutch hunter even affirms that there are three species of Square-mouthed Rhinoceros, and four of the Prehensile-lipped, seven in all ; and he bases his distinctions almost

entirely on the shape and length of the horns in different individuals.

Now I have carefully examined and measured many specimens of Prehensile-lipped Rhinoceroses, and have never been able to discover that they differed in any way the one from the other, except in the length and shape of the posterior horn; nor could I ever discover the differences between the two mentioned by Mr. C. J. Andersson and other writers upon the subject. Some specimens had long curly hair upon their ears; but some of the most marked forms of *R. bicornis* had this peculiarity equally strongly marked as others whose horns showed them to belong to the so-called species *R. keitloa*. Many writers upon the subject state that whereas *R. bicornis* eats nothing but bush, *R. keitloa* eats both grass and bush indiscriminately. Now, if this were the case, how is it that during eight years, more than three fourths of which I have spent in the wilderness, engaged in a continual search for elephants, and always in countries where Rhinoceroses may still be found in greater or lesser numbers, I have only observed two kinds of dung—the black dung, composed entirely of grass, evacuated by the large Square-mouthed grass-eating Rhinoceros, and the dark red dung (with a greenish tinge when the animal has been feeding upon sprouting shoots), full of little chips of wood, evacuated by the prehensile-lipped species. It appears to me that, if there were a species which fed indiscriminately upon grass and bushes, one would see a third kind of dung, in which sometimes bush and sometimes grass would predominate; but this is most certainly not the case. Again, every Kafir and Masara in the interior will tell you that there are three kinds of Rhinoceroses, namely:—*R. simus*, which the Matabele call “Umhofo” and the Bechuanas “Chukuru;” *R. bicornis*, which the former call “Upeygan” and the latter “Borele;” and, lastly, *R. keitloa*, which they name respectively “Shangainea” and “Keitloa.” But when they are questioned beside a dead Rhinoceros, I have found that they all base their distinction between *R. bicornis* and *R. keitloa* upon the length of the posterior horn alone. Some, indeed, will say that the two varieties differ in size or in the length of hair upon the ears. But I have proved, by actual measurement and personal observation, that the variations in size and the length of the hair upon the ears have nothing to do with the length of the posterior horn, which is the fundamental point upon which all Dutch and native hunters base the distinction between the two species. Again, when one comes upon a Rhinoceros-spoor in the bush, any bushman or Kafir hunter can say whether it is the spoor of a Square-mouthed Rhinoceros or of a Prehensile-lipped one, simply judging from the size of the footprint. But no Kafir or bushman can tell you, when he sees the smaller spoor of a Prehensile-lipped Rhinoceros, whether it be that of *R. bicornis* or *R. keitloa*, nor even when he sees the dung can he tell you; for, as I have said before, there is no difference in this particular. However, when the animal has been shot they will say to which species it belongs. If the second horn is not over seven or eight inches in length, they will be all

agreed that the animal is *R. bicornis* (Upeygan or Borele); if the second horn is from twelve inches to two feet long, they will be unanimous that it is *R. keitloa* (Shangainea or Keitloa); whereas if the posterior horn be neither short nor long, but just betwixt and between, they will argue for hours amongst themselves as to whether the animal be *R. bicornis* or *R. keitloa*; but their main argument is always based upon the length of the horn.

Every one who has wandered over country frequented by Rhinoceroses must have noticed that the square-mouthed species leaves its dung alone, not throwing it about with its horn, nor ploughing up the ground every now and again as it walks along; whereas the Prehensile-lipped Rhinoceroses almost invariably throw their dung all over the place, sometimes ploughing up holes a foot deep with their noses and horns; and they are, too, continually making semi-circular furrows in the ground as they walk along. This is done by every Prehensile-lipped Rhinoceros, irrespective of the length of the posterior horn; therefore, if there are two species, it must be conceded that their habits are exactly similar in this respect. Again, the Square-mouthed Rhinoceros (*R. simus*) walks and runs with its nose close to the ground, whilst all Prehensile-lipped Rhinoceroses walk and run with their heads carried high in the air. A calf of the square-mouthed species always runs when small in front of its mother, whereas the small calves of all Prehensile-lipped Rhinoceroses always follow their mothers. Therefore whilst there are many and wide differences of form and habit between the Square-mouthed and all Prehensile-lipped Rhinoceroses, the habits of both species of the latter (if there be two species) are exactly similar.

In conclusion, I have only to bring to your notice the series of horns which is now upon the table, and ask those gentlemen who believe that there are two distinct species of Prehensile-lipped Rhinoceroses in Southern Africa to point out where *R. bicornis* ceases and *R. keitloa* commences.

List of Horns exhibited, and figured on Plate LXII.

(1) Black Rhinoceros, ♂. Shot by J. S. Jameson and myself, near the Umniati river, North-eastern Mashuna land, August 1880. (Plate LXII. fig. 1.)

(2) Black Rhinoceros, ♂. Shot by myself at Thammasetjie, on the Zambesi road, November 1874. (Plate LXII. fig. 2.)

(3) Black Rhinoceros, ♀. Shot by J. S. Jameson on the lower Umfule, North-eastern Mashuna land, August 1880. (Plate LXII. fig. 3.)

(4) Black Rhinoceros, ♀. Shot by myself near the junction of the Gwai and Shangani rivers, Matabele country, September 1873. (Plate LXII. fig. 4.)

(5) Black Rhinoceros, ♂. Shot by J. S. Jameson near the river Umsengairi, North-eastern Mashuna land, September 1880. (Plate LXII. fig. 5.)

(6) Black Rhinoceros, ♀. Shot by H. C. Collison near the

river Umsengaisi, North-eastern Mashuna land, September 1880. (Plate LXII. fig. 6.)

(7) Black Rhinoceros, ♂. Shot by myself on the bank of the river Chobe, August 1874. (Plate LXII. fig. 7.)

(8) Black Rhinoceros, ♀. Shot by one of my hunters between the Umfule and Umzweswe rivers, North-eastern Mashuna land, August 1880. (Plate LXII. fig. 8.)

(9.) Black Rhinoceros, ♀. Shot by one of my hunters between the Umfule and Umzweswe rivers, North-eastern Mashuna land, September 1880. (Plate LXII. fig. 9.)

June 21, 1881.

Prof. Flower, LL.D., F.R.S., President, in the Chair.

The Secretary read the following report on the additions to the Society's Menagerie during the month of May 1881 :—

The total number of registered additions to the Society's Menagerie during the month of May was 130, of which 25 were by birth, 53 by presentation, 35 by purchase, 13 were received on deposit, and 4 by exchange. The total number of departures during the same period, by death and removals, was 124.

The most noticeable additions during the month of May were as follows :—

An African Wild Ass (*Equus tæniopus*) from Upper Nubia, purchased May 26th, being the second example of this form of Wild Ass which we have received.

A White-marked Duck (*Anas specularis*) from Antarctic America, purchased May 26th, being the first specimen of this fine species which has been obtained for the Collection.

Mr. R. Bowdler Sharpe, F.Z.S., exhibited a specimen of *Podilymbus podiceps* of North America, stated to have been killed at Radipole near Weymouth in January 1881, and belonging to the collection of Mr. R. W. Monro.

Dr. A. Günther exhibited a specimen of a Mediterranean fish (*Schedophilus medusophagus*) which had been captured in August 1878 at Portrush in Ireland, and read a description of it.

This description, together with a figure coloured from a drawing of the fish taken in a fresh state, will be published in the Society's 'Transactions.'

The following papers were read :—